

Vitamin D and calcium supplementation in pre-diabetes

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Introduction: Suboptimal vitamin D and calcium status is associated with higher risk of type 2 diabetes. However, evidence from trials is lacking.

Objective: To determine whether vitamin D with or without calcium supplementation improves glucose homeostasis in adults with pre-diabetes.

Design: Double-blind randomized controlled trial

Patients and Methods: Ninety-two adults were randomized in a 2-by-2 factorial design to either vitamin D₃ (2,000 IU once daily) or calcium carbonate (400 mg twice daily) for 16 weeks.

Outcomes: Primary outcome was change in pancreatic beta cell function, as measured by the disposition index after intravenous glucose tolerance test. Secondary outcomes were insulin secretion, insulin sensitivity and clinical measures of glycemia.

Results: Enrolled participants had a mean age of 57 years, BMI of 32 kg/m² and hemoglobin A1c of 5.9%. Disposition index increased significantly in the vitamin D group and decreased in the no vitamin D group (adjusted mean change 300 vs. -126 respectively; p=0.011), which was explained by an improvement in insulin secretion (adjusted mean change 62 vs. -36 respectively; p=0.046). HbA1c rose less in the vitamin D compared to the no vitamin D group (0.06% vs. 0.14% respectively; p=0.081). There was no significant difference in any study outcomes with calcium vs. no calcium and there was no vitamin D × calcium interaction on any outcomes.

Conclusion: In adults at risk for type 2 diabetes, short-term supplementation with vitamin D₃ improves beta cell function and attenuates the rise in glycemia. Long-term trials are needed to confirm the results.